


swimming upstream

San Juan River Basin Recovery Implementation Program
Upper Colorado River Endangered Fish Recovery Program

Spring 2011 runoff rivals records: Good news for endangered fish

 La Niña conditions in 2011 created significantly higher than normal snowpack in the Upper Colorado River Basin especially in the north, such as the Green and Yampa river sub-basins in Utah and Colorado. Upper Colorado River Endangered Fish Recovery Program researchers are optimistic that these conditions will ultimately benefit endangered fishes by improving their spawning habitat and reducing the numbers of nonnative fishes in the system.

La Niña, translated “little girl,” is defined as cooler than normal sea-surface temperatures in the central and eastern tropical Pacific ocean that impact global weather patterns. In the United States, La Niña often features drier than normal conditions in the Southwest and wetter conditions in the Northwest. The National Oceanic and Atmospheric Administration classified this year’s La Niña event as the biggest in 35 years. The northern part of the basin ranged from 170 to more than 200 percent of normal snowpack, while the southern drainages were dryer, like the Gunnison River which received 125 percent and the San Juan River Basin with 90 percent of normal snowpack.

The spring runoff period was cool and wet, which minimized what could have been even larger peak flows. The Green and Yampa rivers produced flows among the top wettest years on record. Located in Utah and Arizona, the peak elevation at Lake Powell increased by 22 feet this year, the highest in 10 years when the drought began. This year, more than 16 million acre-feet of water poured into Lake Powell — the highest volume since the Upper Colorado Program began in 1988.

This high inflow of water caused San Juan River Basin Recovery Implementation Program researchers to adjust their sampling methods to complete a survey of razorback sucker in Lake Powell’s San Juan River arm (see story on page 3.) Otherwise, it was mostly business as usual for San Juan Program researchers who experienced average river flows.

High flows caused both research challenges and opportunities

Since the majority of floodplain habitats are located on the Green River, researchers in those areas experienced some unusual challenges. Staff drove all-terrain vehicles through a foot of water for several weeks to reach the

Ouray National Fish Hatchery in north-east Utah. As the river continued to rise, they switched to using a boat to transport fish food to the hatchery.

In many instances, high, fast-flowing water also forced researchers to delay their work, sometimes as long as two to three weeks until river flows decreased and allowed them to safely launch their boats. Some researchers found themselves working to complete their projects in mid- to late-October when flows are typically too low for boat travel.

On the flip side, high flows benefited sampling efforts because of increased access to important habitats. High flows in the Green River downstream of Flaming Gorge Dam but upstream of the Yampa River in Colorado and Utah created an opportunity for Colorado State University Larval Fish Laboratory researchers to increase sampling for nonnative northern pike in spring 2011.

Typically only small northern pike are collected in backwaters in July and September at Swinging Bridge near the Colorado-Utah state line. Finding northern pike at this location in early spring led researchers to look further during high flows in May and June, which yielded many large northern pike — some exceeding three feet in length. They also found two adult Colorado pikeminnow. This was unusual because Colorado pikeminnow are rare in the 56-mile reach between Flaming Gorge Dam and the upstream end of Lodore Canyon.

Finding the Colorado pikeminnow led to additional sampling during the high flows in nearby sections of the Green River, including at the mouth of Vermillion Creek, a tributary near the boundary of Dinosaur National Monument. Researchers collected a total of 11 Colorado pikeminnow in that section. Of those, several were in spawning condition.



CSU LARVAL FISH LAB CREWS NET FISH IN LOWER VERMILLION CREEK, A SITE MADE ACCESSIBLE BY THIS YEAR’S HIGH FLOWS.

Big flows help endangered fish

High spring flows are important to the life cycle of endangered fish. Rushing water cleanses the riverbed and creates space between the rocks for fish to lay their eggs as well as habitat for aquatic insects that the endangered fish eat. High flows also fill shallow floodplain habitats with warm, still water that allows young fish to grow to a size where they are more likely to survive when they re-enter the swift current of the river’s mainstem.

Flows that benefit the endangered fishes seem to delay spawning by nonnative fishes. Sampling in the Green River and other areas suggests that higher streamflow, coupled with increased water turbidity and lower water temperatures, often disrupts nonnative smallmouth

bass spawning. Also, late-hatching, weak-swimming, young smallmouth bass may be swept away from spawning nests or quiet near-shore habitat, resulting in high mortality.

It may take several years of ongoing research and monitoring for researchers to fully understand the effects of the high flows of 2011 on the endangered and nonnative fishes. Early predictions indicate a similar weather pattern for 2012 which may be just what the endangered fishes need to further their recovery.

For more information, contact Jana Mohrman, 303-969-7322, ext. 268, jana_mohrman@fws.gov.

Editor’s Note: CSU Larval Fish Lab Researchers Kevin Bestgen and Tate Wilcox contributed to this article.




IN SOME INSTANCES, HIGH FLOWS IN THE YAMPA RIVER FORCED RESEARCHERS TO DELAY FIELD WORK. YAMPA RIVER STATE WILDLIFE AREA ANGLERS FOUND THIS PARKING LOT FLOODED AND THEIR FAVORITE FISHING SITES UNDERWATER.

2011 River Flow Statistics

River	Gage	Date of 2011 peak	Magnitude (cfs) ¹	Period of gage record (years)	No. of years with higher peaks
Yampa	Deerlodge, CO ²	June 9	25,700	27	1
Yampa	Maybell, CO	June 9	19,600	97	1
Green	Jensen, UT	June 11	32,200	66	3
Colorado	Cameo, CO	June 8	29,000	79	8
Gunnison	Grand Junction, CO	June 8	14,600	103	37
Colorado	Stateline, CO-UT	June 9	46,800	59	5
San Juan	Bluff, UT	June 11	8,400	88	70

¹ cubic-feet-per-second

²April–July, 2011 flow volume was greatest on record

 Look for the water drop icon to identify other high-flow articles.

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Retiring conservationist leaves legacy, p. 4

Dedicated conservationist David Propst is honored for his significant contributions.



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San Juan River fish passage trends show dramatic increases in numbers of native fishes, including Colorado pikeminnow.

San Juan River tributaries provide important habitat for endangered fish

Fish surveys conducted by Colorado Parks and Wildlife (CPW) biologists in two San Juan River tributaries in southwest Colorado this year indicate these are important waters for the conservation of native fishes and may play a significant role in the life cycle of juvenile Colorado pikeminnow.

Yellow Jacket Canyon (YJC) flows into McElmo Creek near the Utah/Colorado border and McElmo Creek flows into the San Juan River. CPW began stocking roundtail chub in McElmo Creek in 2005 and YJC in 2006. The San Juan River Basin Recovery

Implementation Program has been stocking Colorado pikeminnow annually in the San Juan River mainstem since 1996.

From 2007 to 2010, Bureau of Land Management (BLM) crews captured 11 juvenile Colorado pikeminnow during annual fish sampling in the YJC. In 2010, six Colorado pikeminnow were collected, of which one was PIT tagged (see story below).

"This was the fourth consecutive year that at least one Colorado pikeminnow was collected within this established sample site," said Tom Fresques, BLM West Slope fisheries biologist. "It appears that use of YJC by Colorado pikeminnow is more than casual, given the numbers of fish collected in the past couple of years. Of interest is the fact that the mainstem San Juan River is over 25 miles downstream from where these fish reside."

CPW Biologists Jim White and Paul Jones conducted a native fish survey of the tributaries in 2007 and in 2011.

In McElmo Creek, native fishes comprised 83 percent of the total catch in 2011 compared with 91 percent in 2007. Flannelmouth sucker were the most abundant native fish captured in 2011 (50 percent). One PIT tagged juvenile Colorado pikeminnow was recaptured. This fish was first captured without a PIT tag by Fresques in 2010 in YJC about half a mile upstream.

In YJC, native fishes comprised 81 percent of the fish captured with speckled dace the most numerous (43 percent). No Colorado pikeminnow were captured but this could



A COLORADO PARKS AND WILDLIFE CREW COLLECTED A COLORADO PIKEMINNOW ABOUT 18 MILES UPSTREAM OF THIS LOCATION IN McELMO CREEK.

be due to timing of the survey. The 11 juvenile Colorado pikeminnow from 2007 to 2010 were captured during late summer/early fall surveys. This year was the first spring fish inventory effort.

Work continues in McElmo Creek and YJC to better understand the abundance, distribution and seasonal use of these streams by native fishes. In September, two PIT tag antennas were installed across the bottom of both tributaries. Shortly after installation, Colorado pikeminnow were detected.

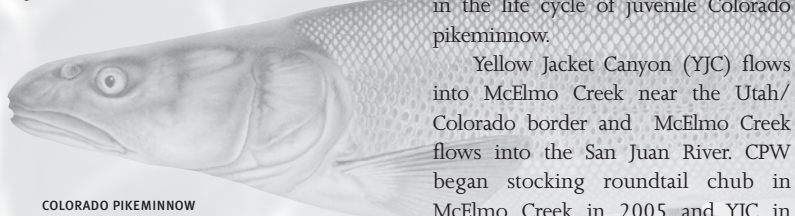
Fish capture data from McElmo-YJC shows promise for Colorado pikeminnow and razorback sucker recovery.

"The Recovery Program has focused on the mainstem San Juan River but recognizes it is time to start looking at all potential habitats in the basin," said Sharon Whitmore, assistant director,

San Juan Program. "This tributary work addresses a number of management actions needed to minimize or remove threats to species recovery, including providing sufficient range for all life stages, range expansion, regulating non-native fish escapement, and minimizing the threat of razorback sucker hybridization with white sucker."

For more information, contact Jim White, 970-375-6712, j.white@state.co.us. 🐟

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COLORADO PIKEMINNOW



BIOLOGISTS TAG A JUVENILE COLORADO PIKEMINNOW TAKEN FROM YELLOW JACKET CANYON, A TRIBUTARY TO THE SAN JUAN RIVER. THE TAGGED FISH WAS RETURNED TO THE CREEK.

BUREAU OF LAND MANAGEMENT

BUREAU OF LAND MANAGEMENT

Researchers experiment with variety of tools to track fish

Tracking numbers and movement of endangered fish in more than 1,100 miles of muddy rivers and streams in the Upper Colorado River Basin is important to evaluate the success of management actions to recover the endangered fishes. Because fish are constantly on the move, biologists with the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program use a variety of tools to track them.

During the past several years, the recovery programs have experimented with remote sensing devices that capture the movement of fish implanted with a passive integrated transponder (PIT) tag. A PIT tag is a small microchip in a glass capsule (about the size of a large grain of rice), like those placed in a dog or cat at a veterinary clinic for individual identification.

All endangered fish and some other native and nonnative fishes are PIT tagged and released into the river where they become available for future detection. Until recently, tracking fish required recapture by electrofishing or in fish traps. Now, remote detection is an option as fish travel through, over or under antenna systems installed to detect them.

PIT tags are activated by a transceiver which generates a close-range, electromagnetic field. When the tag is activated, it transmits its unique number to the reader where it is stored electronically to identify individual fish. The process is similar to scanning bar codes in a grocery store.

"Uniquely identifying the fish is important because researchers use this information to document fish movement, calculate population size, and obtain weight, length and age data," said Bureau of Reclamation Researcher Mark McKinstry. "We also gain information to help answer questions about fish use of passage facilities, screens and other water infrastructure such as irrigation canals and ditches."



A PIT TAG READER INSTALLED THIS YEAR IN THE MAYBELL DITCH IN NORTHWEST COLORADO WILL ALERT RESEARCHERS IF ANY ENDANGERED FISH ENTER THE CANAL.

BUREAU OF RECLAMATION

Transceivers and antennas range in size from small, hand-held scanners, to large, instream antenna that can span the entire width of a stream or canal like the one constructed this year in the privately owned Maybell Ditch, a 12-mile long irrigation canal on the Yampa River in northwest Colorado.

"Ironically, while the system represents some of the most cutting-edge fish monitoring technology to date, managers hope that it doesn't record a single endangered fish because once a fish enters the canal system, it is thought that the chances are slim or none that it can make it back to the Yampa River alive," explained Reclamation Fish Biologist Dave Speas who oversaw the installation. If any endangered fish are detected in the canal during the next two years, the U.S. Fish and Wildlife Service and the Upper Colorado Program will determine appropriate measures to keep them out.

Antenna detects 124 fish during first year of operation

A solar-powered PIT tag antenna system installed in August 2010 at the head of the Price-Stubb Diversion Dam fish passage on the Colorado River in western Colorado detected 124 fish as of Sept. 20, 2011. The antenna helps researchers learn important information about individual fish, including how many use the Price-Stubb fish passage and the Grand Valley Project Diversion Dam fish passage 5.4 miles upstream.

For example, two Colorado pikeminnow were detected only four days after the antenna became operational. One of these fish was detected traveling upstream through the passage and exactly one month later was detected coming downstream past the antenna. This same fish was detected traveling upstream through the passage 13 months after the second detection.

Eighty razorback sucker stocked in 2010 near Battlement Mesa and Silt in western Colorado were detected. Although most of these fish were moving downstream, five swam upstream past the antenna. An additional six razorback sucker stocked between 2000 and 2008 passed through the antenna.

Eleven bonytail moved through the passage shortly after being stocked at a location upstream of the Price-Stubb and Grand Valley diversion dams.

The antenna also detected other tagged native fish — 24 roundtail chub and one flannelmouth sucker.

For more information, contact Travis Francis, 970-245-9319, ext. 15, travis_francis@fws.gov. 🐟

"The Recovery Program owes Maybell rancher Darryl Steele and Maybell Ditch President Mike Camblin a great deal of thanks for their cooperation and willingness to allow us access to the ditch for this study," Dave said. "Their willingness to allow us to install the PIT tag system demonstrates a high level of cooperation and trust between private water users and the Upper Colorado Program."

The recovery programs continue to experiment with antenna systems to improve detection methods including a floating antenna that detects fish as

they move beneath it. Plans are underway to construct a stationary antenna in 2013 at the Hogback Diversion Dam Weir on the San Juan River.

PIT tag antennas enable researchers to gain valuable insight into the movement patterns of endangered and other native fishes and eliminates the stress associated with repeated capture and release.

For more information, contact Mark McKinstry, 801-524-3835, mmckinstry@usbr.gov or Dave Speas, 801-524-3863, dspeas@usbr.gov. 🐟



UTAH STATE UNIVERSITY RESEARCHER PETER MACKINNON TESTS A FLOATING PIT TAG ANTENNA ON THE SAN JUAN RIVER.

BUREAU OF RECLAMATION

Endangered razorback sucker spawn for first time in Utah's White River

In late June, Upper Colorado River Endangered Fish Recovery Program researchers discovered endangered razorback sucker larvae for the first time in the White River in eastern Utah. This clearly documents successful razorback sucker reproduction in that reach of critical habitat, most likely by stocked fish.

Razorback sucker have been extremely rare in the White River until recent years. The larvae were found after U.S. Fish and Wildlife Service biologists observed razorback sucker in spawning condition while conducting Colorado pikeminnow population estimates.

Biologists identified four backwater areas in the lower 24 miles of the White River where they thought drifting larval fish might enter. Using light traps set in those locations, several half-inch larval fish were collected from one of those habitats located about five miles upstream of the Green River confluence.

The identity of the larvae was confirmed by Colorado State University's Larval Fish Laboratory in Fort Collins, Colo.

"We used a computer-interactive key and guide to distinguish the larvae from other species of sucker that live in Upper Colorado rivers," said Darrel Snyder, CSU Larval Fish Lab curator. "The key and guide were developed by the lab over a 25-year period. They incorporate more than 100 potentially diagnostic early-life-stage characters, such as pigmentation patterns, numbers of muscle segments (myomeres) in the body and developmental state relative to size."

Researchers welcomed the news that razorback sucker are spawning in the White River, the second largest tributary to the Green River. This and



U.S. FISH AND WILDLIFE SERVICE RESEARCHER AMADEUS GUY SETS A LIGHT TRAP TO ATTRACT LARVAL FISH IN UTAH'S WHITE RIVER.

other tributaries — the Duchesne, Price, San Rafael and Yampa rivers — help maintain important Green River habitat that endangered fish need to complete their life cycle.

"The White River has long been recognized as a stronghold for Colorado pikeminnow and other native species — and, just as important, as a place where nonnative fish are scarce," said Upper Colorado Program Director Tom Chart. "With this year's report of razorback sucker spawning there, the importance of the White River to endangered fish recovery has increased even more."

For more information, contact Aaron Webber, 435-789-0366, ext. 21, aaron_webber@fws.gov.

Editor's Note: Draft flow recommendations are under review for the White River. This is a first step toward protecting spring and base flows to help recover the endangered fishes.

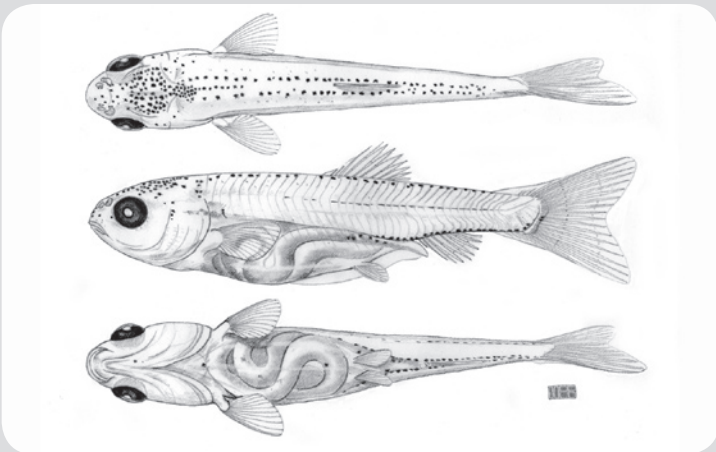
the fisheye: Fish biologist combines love of biology, aquatic systems and art

Howard Brandenburg, a fish biologist with American Southwest Ichthyological Researchers (ASIR), in Albuquerque, N.M., and a principal investigator for larval fish monitoring on the San Juan River, shares his story for The Fisheye, a new Swimming Upstream series about interesting people involved with endangered fish recovery.

Describe your work. ASIR's work focuses on threatened and endangered fishes in New Mexico and a few surrounding states, including the early life history of imperiled fishes. This brief, early life stage is fascinating both in a biological context and as it relates to my work identifying larval fishes in the laboratory. I also conduct research projects in the field. I have also created color scientific illustrations of all 63 of New Mexico's native fishes including a few endangered Colorado River fishes.

How are you involved with the San Juan Program? I began working on the San Juan River in 1995 as a student at the University of New Mexico (UNM) where I studied art and fish biology. One of my first jobs was collecting larval fish in the San Juan River and looking for evidence of Colorado pikeminnow reproduction. During the field seasons, I lived alone in a small trailer on the Navajo Reservation along the banks of the San Juan River. The solitude allowed me time to work on art. I became more involved with the Recovery Program in 1998 as co-principal investigator of a project to document razorback sucker reproduction in the San Juan River. I later did the same thing with Colorado pikeminnow.

How long have you been doing fish illustrations? During the late 1990s, I received a contract through the New Mexico Department of Game and Fish (NMDGF) to create black-and-white line illustrations of New Mexico's threatened and endangered fishes. As time passed, I began to illustrate reptiles, bats, spiders, parasites and Mimbres (a prehistoric culture) pottery designs. Of all the illustrations I have done over the years, I most enjoy creating scientific illustrations of fishes. I find their diversity of color, form and structure patterns (scales, rays and symmetry) to be very aesthetic.



FISH BIOLOGIST HOWARD BRANDENBURG IS EXPANDING HIS SKILLS TO PRODUCE HIGHLY DETAILED ILLUSTRATIONS OF LARVAL FISH SUCH AS THIS RIO GRANDE SILVERY MINNOW.

Describe your illustrations. The color illustrations of New Mexico fishes depict adult specimens, often fish in breeding colors. Each illustration uses a combination of ink, water color, color pencil, acrylic paint and graphite. As scientific illustrations, details must all be true to the actual animal. I rely on preserved specimens acquired on loan from the Museum of Southwestern Biology at UNM and the contributions of other researchers including their photographs and observations. Ultimately, I would like to capture and photograph all of the specimens myself.

How are your illustrations used? The color illustrations of New Mexico's native fishes have been reproduced in reports and books and as postcards and bookmarks distributed to wildlife refuges, schools and in professional settings by NMDGF. Other illustrations have been included in journal publications and books. There is a lot of potential for the color fish illustrations to be used to teach future generations about the value of species diversity and the importance of healthy aquatic ecosystems.

What are your future plans? I always look for more opportunities to illustrate color versions of adult fishes and to use what I have learned to improve some of my early illustrations. I recently began illustrating larval fishes. The illustrations

include numerous stages of development and must be very precise for researchers to use them to identify specimens. I feel this is a way I can use my drawing skills to assist in recovery and survival of endangered and other native fish species. I love fish biology, aquatic systems and art (both illustration and painting), and hope to continue working in these fields throughout my life.

For information, contact W. Howard Brandenburg, 505-341-9312, whburg@gmail.com.



HOWARD BRANDENBURG COMBINES HIS LOVE OF FISH BIOLOGY, AQUATIC SYSTEMS AND ART AS HE COMPLETES A FISH ILLUSTRATION IN HIS ART STUDIO.

Endangered fish found in Lake Powell

In 2011, the San Juan River Basin Recovery Implementation Program launched a study to determine how many razorback sucker may be occupying the San Juan arm of Lake Powell and if these razorback sucker are reproducing in the reservoir, located in Arizona and Utah. Researchers from the Navajo Nation Department of Fish and Wildlife, Utah Division of Wildlife Resources (UDWR) and U.S. Fish and Wildlife Service sampled for a total of nine weeks, from mid-March to mid-June.

Getting to the study area is no easy task. The field crews boat 35 miles down Lake Powell from Bullfrog Marina, turn east into the San Juan River arm and

proceed another 50 miles to where the reservoir and river meet. Once in the study area, the crews erect large tents to escape the high winds, blowing sand, rain, sleet, snow and blazing sun that typify this area during spring and summer.

Researchers used trammel nets* and electrofishing** to collect fish on 35 miles of Lake Powell from near Neskahi Canyon upstream to the waterfall on the San Juan River near Piute Farms. They surgically inserted sonic tracking devices into some fish to track their movement in deep water and placed nets where they would most likely be caught. Researchers also conducted some larval sampling.

"The use of sonic tags has worked very well in Lake Mead where a similar project is ongoing to locate spawning aggregations of razorback sucker," said Bureau of Reclamation Researcher Mark McKinstry. "That effort has identified the only known recruiting population of razorback sucker in the Colorado River Basin."

During the study, researchers captured 75 razorback sucker. Before they were returned to the lake, the fish were checked for a PIT tag or tagged if no tag was present. Of the razorback sucker captured, 48 were tagged, indicating they were stocked in the San Juan River near Shiprock, N.M., before 2011. The other 27 untagged razorback sucker are of unknown origin.

Two of the 75 razorback sucker captured in Lake Powell were subsequently captured in the Lower San Juan River in August. They had moved 46 and 60 miles from the time they were captured in Lake Powell. Sampling also revealed razorback sucker spawning occurred in Lake Powell where a larval razorback sucker was caught on June 9.

Researchers also captured and released 24 Colorado pikeminnow that are likely the result of stocking efforts in the San Juan River near Shiprock. Four of the fish were adults.

"The encouraging results from 2011 indicate a population of razorback sucker inhabiting the San Juan arm of Lake Powell," said UDWR Biologist Darek Elverud, one of the principal investigators of the project. "In 2012, the study will continue and focus on



FROM LEFT: BIOLOGISTS TRAVIS FRANCIS, U.S. FISH AND WILDLIFE SERVICE; DAREK ELVERUD, UTAH DIVISION OF WILDLIFE RESOURCES; AND ALBERT LAPAHIE, NAVAJO NATION DEPARTMENT OF FISH AND WILDLIFE, WITH A RAZORBACK SUCKER CAPTURED DURING FISH SURVEYS IN THE SAN JUAN ARM OF LAKE POWELL IN 2011.

obtaining an estimate of the number of razorback sucker in the San Juan arm, determining if razorback sucker are successfully spawning, and if young razorback sucker are recruiting into adult razorback sucker in Lake Powell."

For more information, contact Travis Francis, 970-245-9319,

travis_francis@fws.gov, or Darek Elverud, 435-259-3782, darekelverud@utah.gov.

*A three-layered net that traps fish in two or more layers of mesh.

**A small electric current placed on the water temporarily stuns the fish, causing them to rise to the surface where they are netted.



RESEARCHERS COLLECTED ENDANGERED FISH IN LAKE POWELL THIS YEAR THAT LIKELY ENTERED THE LAKE VIA THIS WATERFALL THAT CONNECTS THE RIVER TO THE LAKE.

Recovery programs announce leadership changes

Several personnel changes occurred during the past year that brought new roles to some familiar faces and introduced new staff.

Harry Crockett is the Native Aquatic Species Coordinator for Colorado Parks and Wildlife. He represents Colorado on the Biology Committees for both the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. He also serves on other multi-jurisdictional recovery teams, including the Colorado River cutthroat and boreal toad recovery teams, among others. Harry also coordinates Colorado's conservation efforts for native fish and amphibians statewide.

Harry has a bachelor's degree from the University of Kansas in Lawrence and a master's degree in Aquatic Ecology from Colorado State University in Fort Collins. He can be reached at 970-472-4339, harry.crockett@state.co.us.

Dale Ryden became assistant project leader last January for the U.S. Fish and Wildlife Service's Colorado River Fishery Project offices, in Vernal, Utah, and Grand Junction, Colo. Shortly after assuming that position, he was



DALE RYDEN

named acting project leader of the complex that includes both offices and the Ouray National Fish Hatchery. Dale supervises research activities and implementation of work projects. He also represents the Service on both the Upper Colorado and San Juan Programs' Biology Committees.

Dale has a bachelor's degree in the biological sciences from Mesa State College in Grand Junction, Colo., and attended both California State University-Fresno and Moss Landing Marine Laboratories (near Monterey, Calif.) during graduate school. He can be reached at 970-245-9319, ext. 25, dale_ryden@fws.gov.

Karl "Dave" Schnoor became assistant project leader and hatchery manager last January for the two units of the Ouray National Fish Hatchery



"DAVE" SCHNOOR

— the Randlett Unit near Vernal, Utah, and the Grand Valley Unit in Grand Junction, Colo. Dave supervises hatchery operations to ensure they produce genetically sound endangered fish and achieve annual stocking goals to re-establish self-sustaining populations. Dave has a bachelor's degree in wildlife

management and a master's degree in zoology with an emphasis in fisheries from Southern Illinois University in Carbondale. He can be reached at 435-828-7134, karl_schnoor@fws.gov.

Ted Smith became superintendent of the J.W. Mumma Native Aquatic Species Restoration Facility in Alamosa, Colo., in March. In this role, he oversees conservation of rare aquatic native species including 10 species of native fish, including the four endangered Colorado River Basin fishes, and one amphibian — the boreal toad.

Ted has a bachelor's degree in fishery biology with a concentration in fish culture from Colorado State University in Fort Collins, Colo. He has a vocational teaching credential in aquaculture from the Colorado State Board for Community Colleges and Occupational Education, also from CSU and a certification in seafood industry standards from Washington State University in Warm Springs, Oregon. He can be reached at 719-587-3392, theo.smith@state.co.us.



TED SMITH

Conservationist's work continues to guide healthy desert aquatic ecosystems as he retires

When Dr. David Propst retired from the New Mexico Department of Game and Fish last summer, he was honored for his significant contributions toward sustainable management of desert aquatic ecosystems and their native plants and animals. During his 20-year stint on the San Juan River Basin Recovery Implementation Program's Biology Committee, endangered Colorado River fishes benefitted from his work.

David first began working on San Juan River issues during the mid-1980s as part of a team that rediscovered a population of Colorado pikeminnow that was thought to be nearly extinct. For the next 30 years, his dedicated advocacy for conservation made him a highly valued expert on issues related to surface water and endangered species.

During David's career, he worked extensively on the Gila, Pecos, Canadian and Rio Grande rivers. He helped establish some of the longest-running research programs on fishes in New Mexico including 22 years of data on Gila River fishes. He helped establish the survey protocols on Rio Grande and Pecos River fishes that have been used annually for 19 years and 22 years, respectively, and he was involved in 24 years of fish surveys in the San Juan River.

David is also recognized for his efforts to instill young scientists with the knowledge and passion to carry forward his work. He worked tirelessly to bridge the gap between agency biologists, academicians and field biologists. Through those diverse collaborations, he found ways to fund graduate students and mentor young scientists. His impact on the conservation of native fishes will persist long into the future through the highly trained and dedicated biologists who are following in his footsteps.

During his extraordinary career, David published more than 50 peer-reviewed papers and authored countless other technical agency reports.

"David's departure leaves a hole that will be hard to fill, not only because of his valued expertise but because of the dedicated conservationist that he is," said San Juan Program Director Dave Campbell. "We will do our best to carry forward his work."



DR. DAVID PROPST

Recovery programs news and updates

swimming upstream



Colorado Division of Wildlife and Colorado State Parks merge

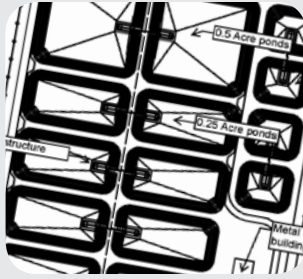
Colorado Governor John Hickenlooper signed legislation combining the Colorado Division of Wildlife with Colorado State Parks to form Colorado Parks and Wildlife. Effective July 1, the purpose of the merger was to find efficiencies during difficult economic times, avoid closure of some state parks, and continue successful management and protection of wildlife. A transition team of employees from both agencies is developing a merger plan that will undergo public comment and several approvals before it is finalized next spring. The merger is not expected to change the way the state works with partners to recover endangered species. For information: Randy Hampton, 303-291-7482, randy.hampton@state.co.us.



DEBBIE FELKER

Dinosaur National Monument reopens visitor center and quarry

Utah Governor Gary Herbert welcomed more than 1,000 visitors to the grand reopening of Dinosaur National Monument's new visitor center and Quarry Exhibit Hall on Oct. 4. The visitor center features exhibits explaining the monument and its features, including information about the endangered Colorado River Basin fishes. The hall is built over the famous Carnegie Dinosaur Quarry site and provides close viewing of almost 1,500 dinosaur bones from the Jurassic Period. Bones are exposed on the cliff face where they were deposited about 149 million years ago. The quarry closed in 2006 for repair to ensure visitor safety. For information: Dan Johnson, 435-781-7702, dan_johnson@nps.gov.



BUREAU OF RECLAMATION

Horsethief Canyon native fish facilities contract awarded

The Bureau of Reclamation awarded a \$4.8 million contract to Kissner General Contractors Inc., of Cedaredge, Colo., in September to construct the Horsethief Canyon Native Fish Facilities in western Colorado. The facility will include 22 grow-out ponds to hold and rear endangered Colorado River fishes for both recovery programs.

"This contract represents another significant step in the ongoing collaborative conservation work to protect and restore the endangered Colorado River fish populations," said Reclamation Commissioner Michael Connor.

Construction is slated for completion in the fall of 2012. For information: Justyn Hock, 970-248-0625, jhock@usbr.gov.



KENNY HOSACK

Rafters admire researchers' work

A crew of 12 Utah Division of Wildlife Resources researchers, including Nicole Cappuccio (pictured with an endangered razorback sucker), talked to a group of people rafting the San Juan River last spring. Kenny Hosack, director of provider relations for Craig Hospital in Englewood, Colo., had high praise for them.

"Paul Badame was in charge," Kenny said. "We ran parallel with them for a few days and watched them tirelessly net catfish. We invited them to our camp one afternoon to explain what they were doing. They are nice folks and very professional and hard working."

This is just one example of the many interactions with the public that researchers experience during the course of their work each year.

Swimming Upstream is a publication of the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program. These programs are national models of cost-effective, public and private partnerships. The programs are working to recover endangered fishes while water development continues in accordance with federal and state laws and interstate compacts, including fulfillment of federal trust responsibilities to American Indian tribes.

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Program director's message

By Tom Chart, Program Director
Upper Colorado River Endangered Fish Recovery Program

The year 2011 provided partners with both the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Implementation Program with some interesting discoveries. I'd first like to thank all of the researchers for their hard work and dedication in the field this year and for helping us share their news in this issue of *Swimming Upstream*. And, of course, their work could not be accomplished without the support of many others whose efforts ensure that those in the field can complete their work safely and on time.

In my mind, the biggest story this year was the big water we experienced in the upper portions of the Upper Colorado River Basin. It was great to see that Mother Nature still has considerable spring in her step, as evidenced by her marathon rain dance across the upper tier of the basin.

As you will read, the volume of water that flowed down the Yampa River in 2011, a Green River tributary, turned out to be the greatest on record. We witnessed more floodplain connection throughout the Uintah Basin in Utah than we have seen since the Upper Colorado Program was established 23 years ago. And, whereas flooding does not necessarily evoke jubilation for everyone, we were all in awe of what these rivers are capable of when the snow piles up as high as it did last winter and spring.

Although the San Juan River drainage did not receive the same snowpack as the sub-basins of the Green and Colorado rivers, researchers sampling in the San Juan River arm of Lake Powell experienced significant discoveries of their own (see story on page 3) as the lake level increased at an unpredicted rate. In April, a waterfall on the lowest portion of the San Juan River stood 15 to 20 feet above the inflow to Lake Powell. By July, the lake had swelled to within a foot or two of inundating it.

I will let the individual field discoveries speak for themselves, as chronicled by the many authors of our featured stories. However, I would like to mention a telephone call I received on Oct. 18 from Aaron Webber, a U.S. Fish and Wildlife Service biologist in Vernal, Utah.

Aaron started with, "Are you sitting down?" Although we all know that kind of statement can be the lead-in for two very different types of conversation, I could tell that Aaron was about ready to burst with good news.

Aaron and his field crew had just discovered seven juvenile-sized razorback sucker in a floodplain habitat in the Ouray National Wildlife Refuge. This may not sound like much to some folks, but to Aaron and other researchers, this meant our hatchery-produced razorback sucker had survived, matured in the river and successfully spawned in the wild. Their larvae had ridden the high spring flows up onto the floodplain where they found suitable habitat to grow from a larval size of about a half-inch to a juvenile size of about 6 inches over the course of their first summer. Captures of juvenile-sized razorback sucker are few and far between — 2011 was a very good year!

My hat is off to those who continue to work tirelessly, whether on the biological or programmatic fronts, and to those who provide the necessary support to ensure that our programs can achieve endangered species recovery.

All the best to you and your families in the coming year. ➤



Wilson honored with outstanding achievement award



OUTSTANDING ACHIEVEMENT AWARD RECIPIENT
KRISSY WILSON

UTAH DIVISION OF WILDLIFE RESOURCES

The Upper Colorado River Endangered Fish Recovery Program presented Krissy Wilson with an outstanding achievement award last January for her many contributions to endangered fish recovery. As the native aquatics coordinator for the Utah Division of Wildlife Resources (UDWR), she administers a statewide program to evaluate and assess the status of native fish, amphibians, reptiles and mollusks; oversees implementation of conservation actions to protect and enhance populations of native species; and administers contracts and annual budgets.

Krissy is a tireless defender of numerous aquatic species including the June sucker, Columbia spotted frog, boreal toad, least chub, blue-head and flannelmouth suckers, and roundtail chub, to name a few. In 2006, she became Utah's representative to the Upper Colorado Program's Biology Committee. Her experience with conserving other species helps shape management actions to benefit the endangered fishes.

As the Upper Colorado Program developed and implemented nonnative fish management actions last year that focus on prevention as well as control, Krissy worked to adapt policies within UDWR to support that strategy. This included developing and implementing a "must kill" policy for nonnative

smallmouth bass and burbot caught in the Green River, and a rapid response to an illicit introduction of nonnative fishes into Utah's Red Fleet Reservoir.

"Those new regulations will further the Recovery Program's work to manage nonnative fishes," said Upper Colorado Program Director Tom Chart who presented the award. "Recovery Program partners recognize it is not easy for our state partners to balance their dual goals of providing sport-fishing opportunities and conserving native species. Krissy finds solutions that support her agency's mission, including recovering the endangered Colorado River fishes."

Krissy came to UDWR in 1996 as a native species biologist. She has a firsthand understanding of a species' life history as well as what is needed to restore and maintain river habitat. She has also worked with private landowners to access property and establish conservation agreements/easements. Her efforts resulted in the donation of a conservation easement to UDWR of 600 acres of prime riparian and wetland habitat for Columbia spotted frog and other wildlife valued at \$10 million, and a \$237,500 donation toward an endowment fund to monitor the easement.

Krissy is quick to acknowledge others for her successes. "I am honored and grateful to receive this award and I accept it on behalf of the great team of people who I am fortunate to work with," she said. "We all face many challenges when it comes to achieving conservation goals and it takes all of us working together to accomplish them."

Krissy has a bachelor's degree in environmental resource management from Arizona State University in Tempe and a master's degree in zoology from Brigham Young University in Provo, Utah. She is active in many professional organizations and has published numerous professional articles. ➤

Studying effects of Flaming Gorge Dam spring releases on endangered fishes

—by Kevin Bestgen, Ph.D., Director, Larval Fish Laboratory, Colorado State University

Although the Green River system in Utah and Colorado historically supported large numbers of razorback sucker, the population of this endangered fish had been relatively small since at least 1980 and subsequently declined. Lack of survival of young fish to adult life stages is the main reason for the decline of razorback sucker, and is likely due to combined effects of habitat alterations from river regulation by dams and negative effects of nonnative fishes which prey upon and compete with early life stages of razorback sucker.

In an effort to rebuild populations in the Green and Colorado river sub-basins, the Upper Colorado River Endangered Fish Recovery Program has been stocking hatchery-produced razorback sucker since 2004. The San Juan River Basin Recovery Implementation Program is conducting a similar re-introduction effort in that sub-basin.

Flow recommendations implemented in 2005 to guide operation of Flaming Gorge Dam in northeast Utah were developed, in part, to improve habitat for razorback sucker, mainly by increasing the availability of floodplain wetland habitat in spring when razorback sucker larvae emerge. Floodplain wetlands are important for early life stages of razorback sucker because they are warm and food-rich and may promote fast growth and high survival of larvae relative to the cold and food-poor mainstem Green River.

It was unknown if timing of availability of larvae overlapped sufficiently with availability of wetlands for recruitment to occur. That topic was the subject of a recently completed report titled, *Synthesis of Floodplain Wetland Information: Timing of Razorback Sucker Reproduction in the Green River, Utah, Related to Streamflow, Water Temperature, and Floodplain Availability*.*

The authors of that report first examined patterns of abundance of razorback sucker larvae captured in light traps in spring in the Middle Green River from 1992-2010. Larvae were present every year in the Middle Green River since 1992 but abundance was highly variable. Throughout that 19-year study period, the Bureau of

Reclamation, which operates the dam, coordinated with Upper Colorado Program partners and the public to schedule spring releases to generally coincide with the peak of the Yampa River and, thereby, connect the Green River to its floodplain downstream of their confluence.

The authors then compared flow patterns and timing of razorback sucker larvae captures since 1992. They found that in many years, the dam operations connected the floodplain too early, i.e., before the larval razorback sucker were present. Thus, a main recommendation of the report was to investigate the feasibility of shifting the timing of spring flow releases to later — after razorback sucker larvae are present — to maintain connections with floodplain wetlands and increase the rate of larvae moving into the wetlands.

Study results show that causing floodplain connections in the Middle Green River at the biologically correct time will likely be more challenging in drier and average years, but easier to achieve in wet years. For instance in the high water year of 2011, there was more floodplain connection in the Middle Green River after larval razorback sucker were detected than had been observed in the previous



AARON WEBBER, U.S. FISH AND WILDLIFE SERVICE

AN EXAMPLE OF FLOODED WETLAND HABITAT ON THE GREEN RIVER IN UTAH

19 years. Preliminary reports from the field during fall 2011 indicate that not only did drifting razorback sucker larvae find the floodplain during spring 2011; some have survived through their first summer — an important and rare finding.

Building on these recent findings, the Upper Colorado Program continues to work closely with Reclamation to develop a plan to study how, and if, the Middle Green River floodplain can be connected at a more appropriate time to assist in the recovery of the endangered fishes. That plan will likely describe a series of experimental flows

the Recovery Program would like to see in the Middle Green River and explain how to monitor endangered fish response.

For information, contact Kevin Bestgen, 970-491-1848, kbestgen@cnr.colostate.edu or Tom Chart, 303-969-7322; ext 226, tom_chart@fws.gov. ➤

*CSU Larval Fish Lab Research Associate Angela Hill and U.S. Fish and Wildlife Service Biologist Bruce Haines co-authored this report with Dr. Bestgen.

Record numbers of Colorado pikeminnow use fish passage on San Juan River in 2011

—by James Morel, Navajo Nation Department of Fish and Wildlife

When you think about a fish passage, what image comes to mind? Unlike the boulder-strewn stepladders in the northwestern United States where beautifully colored salmon struggle against the current in crystal-clear water, the selective fish passage at the Public Service Company of New Mexico (PNM) Weir on the San Juan River in northwest New Mexico is in a low-lying, meandering, muddy river, armored with Russian-olive and tamarisk. A short diversion in the river directs flow and allows movement of up to 1,000 fish per day and 10 to 12 species at a given time into a capture basin where they await release upstream.

Though the settings are strikingly different, the implications of fish passages are the same. Fish are allowed to move upstream to access habitat they historically used before the construc-

tion of a barrier. Dams, diversion structures, low water crossings and the like are obstacles fish must overcome and biologists must address within rivers all over the world.

The San Juan River is no exception with two major reservoir dams (Lake Powell and Navajo Lake), a major diversion weir that directs water to a power generation station, and many smaller diversion structures constructed for agricultural use. In 2003, the San Juan River Basin Recovery Implementation Program constructed the PNM Fish Passage which enabled fish to move freely above a 3-foot-high diversion structure, allowing access to about 55 additional San Juan River miles and a major tributary, the Animas River.

Catch by species and numbers varies but recent trends have shown dramatic increases in overall numbers of native fishes, with a relatively low number of nonnatives. From April 1 through August 5, 2011, total captures of all native species was 24,596, up from last year's total of 15,620. Of that

catch, 415 Colorado pikeminnow were captured compared with 87 in 2010.

Under a cooperative agreement with the San Juan Program, the Navajo Nation Department of Fish and Wildlife (NNDFW) has operated and managed the passage facility since construction. The facility operates for seven months each year (April through October), seven days a week.

The passage increases habitat for native and endangered fish and enables biologists to monitor population trends, remove nonnative fishes and analyze capture trends related to environmental conditions. Each endangered fish that uses the passage is scanned for a PIT tag* (see story on page 2). Untagged endangered fish are tagged before being released upstream.

Although biologists are investigating the extent to which fish use the upstream reaches above the weir and how this factors into recovery, there is still much to be learned about the dynamics of the relationships between the native fish and their current river environment. With the productive collaboration between the San Juan Program and the NNDFW, the passage remains a success for recovery and will continue to keep fish swimming upstream.

For more information, contact James Morel, 970-779-3120, jmorel@nndfw.org. 🐟

*A passive-integrated transponder (PIT) tag is a small microchip in a glass capsule similar to those placed in a dog or cat at a veterinary clinic for individual identification.



NAVAJO NATION DEPARTMENT OF FISH AND WILDLIFE LEAD FISHERIES TECHNICIAN ALBERT LAPAHIE USES A CRANE TO MOVE A LOAD OF FISH FROM THE CAPTURE BASIN TO THE SORTING TABLE AT THE PUBLIC SERVICE COMPANY OF NEW MEXICO WEIR FISH PASSAGE ON THE SAN JUAN RIVER. THE FISH WILL BE PROCESSED BEFORE BEING RELEASED UPSTREAM.

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Has “flow-conditioning” bonytail improved survival rates?

—by Mike Porras, Public Affairs Specialist, Colorado Parks and Wildlife

Recent data indicates several “flow-conditioned” endangered bonytail have survived reintroduction into their natural habitat. This has Upper Colorado River Endangered Fish Recovery Program biologists crossing their fingers that the experimental technique may finally yield long-sought success.



MUMMA HATCHERY TECHNICIAN DAVE WESTERMAN STOCKS BONYTAIL IN THE COLORADO RIVER IN SEPTEMBER. IN ADDITION TO STOCKING IN PONDS, BONYTAIL ARE STOCKED DIRECTLY INTO THE COLORADO RIVER WHERE RESEARCHERS CONTINUE TO MONITOR THEIR SURVIVAL.

Four years ago, technicians at Colorado Parks and Wildlife’s J. W. Mumma Native Aquatic Species Restoration Facility in Alamosa, Colo., began “flow-conditioning” fish. This process forces fish to swim against an artificially created flow inside their tanks. The hope was that these “trained” fish might stand a better chance at surviving the transition from the relatively stable conditions at the hatchery to the fast-moving waters of their natural environment.

“In addition, we give them two weeks to recover after they are PIT tagged,” said Aquatic Biologist Jenn Logan. “Before, we tagged them, loaded them on trucks and then immediately put them into their new environment.”

Jenn explained that the longer rest period seems to have helped

more fish survive the stressful transition.

Another strategy aimed at increasing survival includes stocking some fish into ponds along the river. At Butch Craig pond near Grand Junction, Colo., the Upper Colorado Program had breaches cut in the levee that connect the pond to the Gunnison River at higher flows. The fish are stocked into the still waters of the pond to give them time to adapt slowly before entering the fast-moving waters of the river at their own pace.

“We think giving the fish time to acclimate to wild conditions in slow-moving waters gives them a much greater chance of surviving,” Jenn said.

In what could be an early sign that the new methods are working, seven bonytail stocked on June 24 were captured in the fish passage at the Redlands Water and Power Company Diversion Dam on the Gunnison River, indicating that bonytail stocked at Butch Craig entered the river, swam downstream and returned back upstream.

A few PIT tagged bonytail were detected at the Price-Stubb Diversion Dam (see story on page 2), and nearly 20 bonytail were captured in the fish passage at the Grand Valley Project Diversion Dam, indicating fish also successfully acclimated in this particular reach of the Colorado River.

As Jenn and other program biologists continue to see evidence that their efforts may be paying off, it provides them with confidence of significant success for reintroduction of bonytail.

“We have learned much and will continue to learn,” she said. “This knowledge will not only help us meet our recovery goals as soon as possible, but it will likely help us maintain the bonytail population once it is recovered.”

For more information, contact Mike Porras, 970-255-6162, mike.porras@state.co.us. 🐟

swimming upstream

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